

Historical Studies of Perchlorate Effects

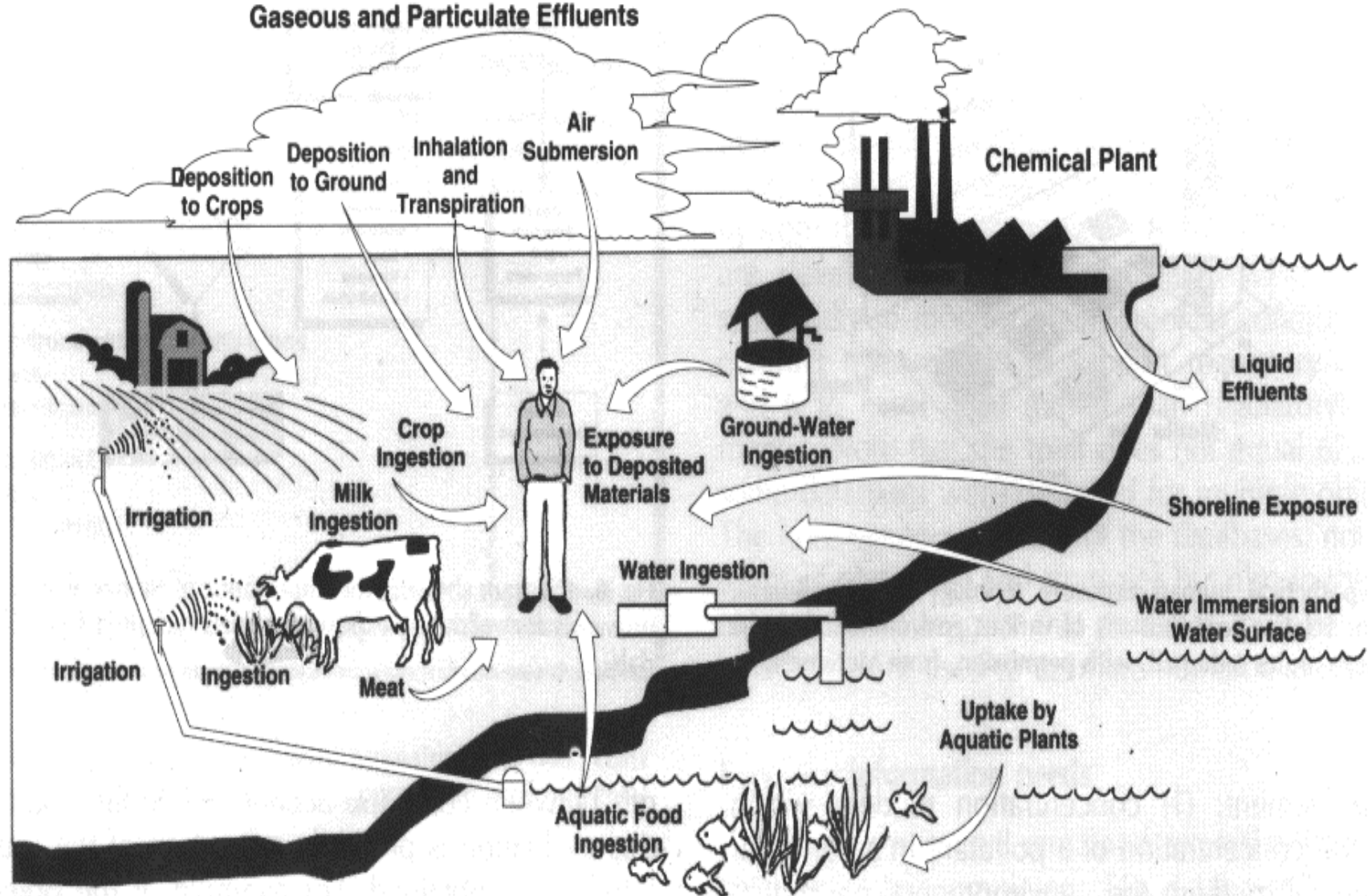
Dr. Ron Porter

Ecological Toxicologist

Human Systems Center

Brooks AFB, TX

Gaseous and Particulate Effluents



Ecological Receptors

- Aquatic biota
 - Sediment organisms
 - Aquatic plants
 - Aquatic vertebrates (fish)
 - Aquatic invertebrates (clams, crayfish, etc.)

Ecological Receptors (cont)

- Terrestrial biota
 - Soil organisms
 - Terrestrial plants
 - Terrestrial vertebrates (birds, mammals, etc.)
 - Terrestrial invertebrates (insects, spiders, etc.)

Ecological Receptors (cont)

- Agricultural products
 - Row crops
 - Livestock
 - Commercial fishing
- Food chain concerns
 - Recreational fishing
 - Fruits and nuts
 - Home gardens

Results of Data Search

AP Acute Effects-Terrestrial

- Corn (growth) 1-1000 ppm (effect)
- Cotton (seeds) 55 g/sq.m. (effect)
- Ryegrass (seeds) 55 g/sq.m. (effect)
- Soybean (growth) 1-1000 ppm (effect)
- Wheat
 - seeds 0.1-1000 ppm (effect)
 - growth 10 ppm (effect)

Data on Other Perchlorates

- Potassium perchlorate
 - Algae 79-360 ppm (effect)
 - Protozoan 23-1117 ppm (effect)
 - Daphnia 82-670 ppm (effect)
- Sodium perchlorate
 - Fish 3000-7000 ppm (effect)
 - Soybean 2.5-30 ppm (effect)

Data on Other Perchlorates (cont)

- Nitronium perchlorate
 - Fish 100-200 ppm (no effect)
 - Squash, peanut, 1000 ppm (no effect)
corn

Results of Data Search

Chronic Effects

- No data for effects of ammonium perchlorate on terrestrial or aquatic plants and animals were found in the literature.
- Limited data for effects of potassium perchlorate were found in the literature
 - Two studies on the thyroid of lampreys
 - One study on growth and productivity of soybeans

Problem

What appropriate species of animals and plants and what assays are appropriate to evaluate potential ecological effects from exposure to ammonium perchlorate?

Proposed Screening Level Bioassays

T e s t O r g a n i s m	M a t r i x
D a p h n i a m a g n a o r C e r i o d a p h n i a d u b i a	S e d i m e n t i n v e r t e b r a t e
C h i r o n o m u s t e n t a n s	L a r v a l s e d i m e n t i n v e r t e b r a t e
H y a l l e l a a z t e c a	S e d i m e n t i n v e r t e b r a t e
L e m n a m i n o r (d u c k w e e d)	V a s c u l a r p l a n t (a q u a t i c)
F a t h e a d m i n n o w	A q u a t i c v e r t e b r a t e
E a r t h w o r m	S o i l i n v e r t e b r a t e
M i c r o t o x	b a c t e r i a (m a r i n e)

Contact

Ron Porter

Det 1, HSC/OEMH

2402 E Drive

Brooks AFB, TX 78235-5114

210-536-6127 Fax 1130

ronald.porter@guardian.brooks.af.mil